

Accepted Manuscript

A review of the use of examples for automating architectural design tasks

Nizam Onur Sönmez

PII: S0010-4485(17)30178-1

DOI: <https://doi.org/10.1016/j.cad.2017.10.005>

Reference: JCAD 2558

To appear in: *Computer-Aided Design*

Received date: 8 August 2016

Accepted date: 23 October 2017

Please cite this article as: Sönmez N.O. A review of the use of examples for automating architectural design tasks. *Computer-Aided Design* (2017), <https://doi.org/10.1016/j.cad.2017.10.005>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A review of the use of examples for automating architectural design tasks**Author:** Nizam Onur Sönmez^a (PhD)**Affiliation:** ^aIstanbul Technical University, Faculty of Architecture**Address:** ^aTaskisla Campus, Taskisla Street, Beyoglu, ISTANBUL / TURKEY**Telephone:** +90 541 518 3543**e-mail:** onursonmezn@yahoo.com**Abstract**

Recent Artificial Intelligence studies have achieved substantial improvements in practical tasks by using extensive amounts of data. We assume that a substantial part of the data to guide artificial design technologies reside in existing design examples. Developing ways to use this data may enable improvements in intelligent design tools, with the hope that these may provide more effective design workflows and more productive design practices. Such improvements may result in more in-depth evaluations of potentials and alternatives for design situations; hence better planning for the spatial environment.

Various approaches have been developed to use representations of architectural examples for artificially tackling architectural design tasks. This study presents a review of the historical development of these approaches, with an overall aim to investigate where and how design examples have been used for practical computational design applications.

The review encompasses traditional and recent Shape Grammar and Procedural Modeling studies, Case-Based Design, Similarity-Based Evaluation and Design, and recent studies on the architectural uses of Machine Vision, Semantic Modeling, Machine Learning, and Classification. The emphasis of the review is on the studies that aim at designing or generating new design examples, particularly for building layouts, façades, envelopes, and massing.

For a comparative evaluation of the current capabilities of the examined lineages of studies, we propose a minimum set of design capabilities, and assess each study through this framework. This reveals the overall patterns of already covered requirements.

The review shows that initial hand-operated SGs gave way to automatic generation, which in turn developed into automated SG extraction, through increasing levels of computational capabilities. Case-Based Design has been neglected; however, it can be reinvigorated through novel AI techniques. On the other hand, Similarity-Based Evaluation may complement and balance the orientation towards technical performance. Machine Learning and Computer Vision appear as potential intermediaries for connecting these threads.

There are example-based studies towards almost all aspects of artificial design; yet, these have not been

Download English Version:

<https://daneshyari.com/en/article/6876451>

Download Persian Version:

<https://daneshyari.com/article/6876451>

[Daneshyari.com](https://daneshyari.com)